INSTRUCTOR'S GUIDE SHEETS

MARINE SHEET METAL VENTILATION

SHOP DRAWINGS AND BLUEPRINT READING

Not Intended for Student Use

VOCATIONAL EDUCATION

FOR NATIONAL DEFENSE

Supplement to

Bulletin 347

Commonwealth of Pennsylvania

DEPARTMENT OF PUBLIC INSTRUCTION

Harrisburg

These instructor's guide sheets are to be used in criticizing and grading trainee assignment sheets. The sheet numbers on instructor's guide sheets correspond with shop drawing numbers in the student work book.

Instructors are requested to report errors, by letter, to "Curriculum Laboratory", Room 306, Mastbaum Vocational School, Philadelphia. A revised teacher's guide will be published after sufficient time has elapsed to permit satisfactory try-out, and necessary changes in both the Work Book and Teacher's Guide.

UPPER DECK

PORT SIDE - FR. 68-72

Questions	Answers
1. What frames are included on drawing No. 1?	68 to 72
2. What is the size and shape of the duct?	15" x 8" Rect.
3. What is the elevation of the duct aft of Fr. 68?	X = 16-1/4
4. What is the elevation of the duct at Fr. 71?	X = 16-1/4
5. What is the elevation of the duct at Fr. 72?	X = 10-1/4
6. What is the rise of type "C" elbow?	6"
7. What is the member "B" called?	Fr. #70
8. State the distance from ℄ of duct to ℄ longitudinal.	16-1/2"
9. State the distance from face of N.W.T. flange to ℄ of Fr. 72.	5-1/4"
10. State the distance from ℄ of duct to longitudinal at Fr. 72.	35"
11. What is the dimension of Fr. 72?	4" x 6"
12. What is the dimension of Fr. 68?	4" x 12"
13. What is the offset in elbow "A"?	18-1/2
14. What kind of flange is 2690?	N.W.T. Rect.
15. What is the width between the frames?	48"
16. What direction do the frames run?	Transverse (Port to Stb'd)
17. What direction does the air flow?	Aft.
18. What is the overall dimension of duct shown on this sketch?	16' 11-1/4"

P38.
1.3
#34
Sup
C. 2

UPPER DECK

STARB'D SIDE FR. 58-59

Questions	Answers
1. State the length of the spool shown on drawing No. 2	9"
2. State the dimensions of the spool.	16-1/2" x 6" F.O.
3. What is the elevation of the spool?	X = 9
4. What is the meaning of the abbreviation F. O. ?	Flat Oval
5. State the elevation of flange 2678.	X = 4-1/2"
6. What is the ℄ distance from flange 2678 to trolley track?	9"
7. State the ℄ distance from Fr. 58 to Fr. 59.	48"
8. State the ℄ distance from Fr. 58 to oval.	24"
9. State length of the duct from flange 2678 to flange 2690.	5' 4-1/2"
10. State length of the duct from flange 2691 to flange 2690.	5' 3-3/4"
11. State the direction of air flow.	Outboard
12. What item determines whether the system is supply or exhaust?	Diffusing Terminal
13. State the dimensions of the rectangular ducts.	16" x 6" Rect. 15-1/2" x 6" Rect.
14. What type flange connects to item 2690?	N.W.T. to W.T.
15. What are the sizes of transformers?	15-1/2" x 6" Rect. to 16-1/2" x 6" F. O. 16-1/2" x 6" F. O. to 16" x 6" Rect.

SUPERSTRUCTURE DK

PORT--FR. 52-54

Questions	Answers
1. What is the scale of drawing No. 3?	3/4" = 1' 0"
2. How long is the terminal?	7"
3. What is the diameter of the terminal "B"?	10" dia.
4. State the elevation of the terminal "B".	X = 16-1/2"
5. In water-tight work, what type joint should be made?	butt weld
6. What is the elevation of the 4" dia. venturi ejector?	X = 16-1/2"
7. What is the elevation of the 11" diameter flange?	X = 16-1/2"
8. State the distance from the ℄ of elbow spool to ℄ of intake.	59-1/2"
9. What does the solid and dash lines at "A" indicate?	W.T.
10. State the length of the fitting "B-B".	38-1/2"
11. State the throat radius of elbow "A".	5" radius
12. What is the meaning of the abbreviation, "1/2 = W.M."?	1/2" wire mesh
13. State the location of this layout.	Superstructure DK Port--Fr. 52-54
14. What type of flange is specified for Bh'd 53?	N.W.T. to W.T.
15. What is the dimension between metal joiner Bh'd?	6' 6"
16. What is the ℄ distance from Bh'd 53 to ℄ of 6-1/2" diameter, assuming that elbow "A" has 1" straight from radius point to ℄ of Bh'd 53?	11"

PORT SIDE FR. 17-19

	Questions	Answers
1.	What is the location of duct shown on this drawing?	Port Side Fr. 17-19
2.	What is the direction of air through section "A"?	In board
3.	State the ℄ distance from 8-1/2" x 5" F.O. to Fr. 17.	23-3/4"
4.	State the ℄ distance from 5-1/2" x 5-1/2" duct to ℄ of Fr. 19.	71-1/2"
5.	Give sizes of shapes at the split fitting.	5-1/2" x 5-1/2" Rect. 12" x 5-1/2" Rect, 6-1/2" x 5-1/2" Rect.
6.	State the distance from ℄ of ship to 8-1/2" x 5" F.O. flange.	6' 5-1/4"
7.	What is the heel radius of fitting "B"?	10-1/2"
8.	State "A" distance from underside of deck to top of 20" x 8" rectangular duct at the extra flange location.	8"
9.	State distance between top of 20" x 8" rectangular duct and underside of Fr. 18.	2"
10.	Give the rise of 20" x 8" rectangular elbow.	4"
11.	Give the rise of 20" x 8" F.O. elbow.	3"
12.	Give direction of air flow in 20" x 8" rectangular duct.	Aft
13.	State the ℄ distance from 20" x 8" rectangular duct to Fr. 19.	5' 1"
14.	What is the scale of this drawing?	3/4" = 1' 0"
15.	State the distance from Fr. 19 to flange.	4"

PORT SIDE

UPPER DECK

Item No.	Description	No. Required
1.	3-1/2" diameter 90° - 6" rad. elbow	2
2.	3-1/2" diameter 30° - 6" rad. elbow	1
3.	3" diameter 60° - 5" rad. elbow	1
4.	3" diameter 30° - Collar	1
5.	3-1/2" diameter 30° - Collar	1
6.	3-1/2" spools 9" long	2
7.	4" x 8-3/4" x 7-1/2" heaters	3
8.	8-3/4" x 7-1/2" W.T. flanges	6
9.	3-1/2" diameter W.T. flanges	4
10.	3-1/2" diameter N.W.T. to W.T. flanges	4
11.	3-1/2" diameter N.W.T. ring flanges	6
12.	3" diameter N.W.T. ring flanges	2
13.	6" diameter clean-outs	3

UPPER DECK
STARB'D SIDE BHD 32-FR 36

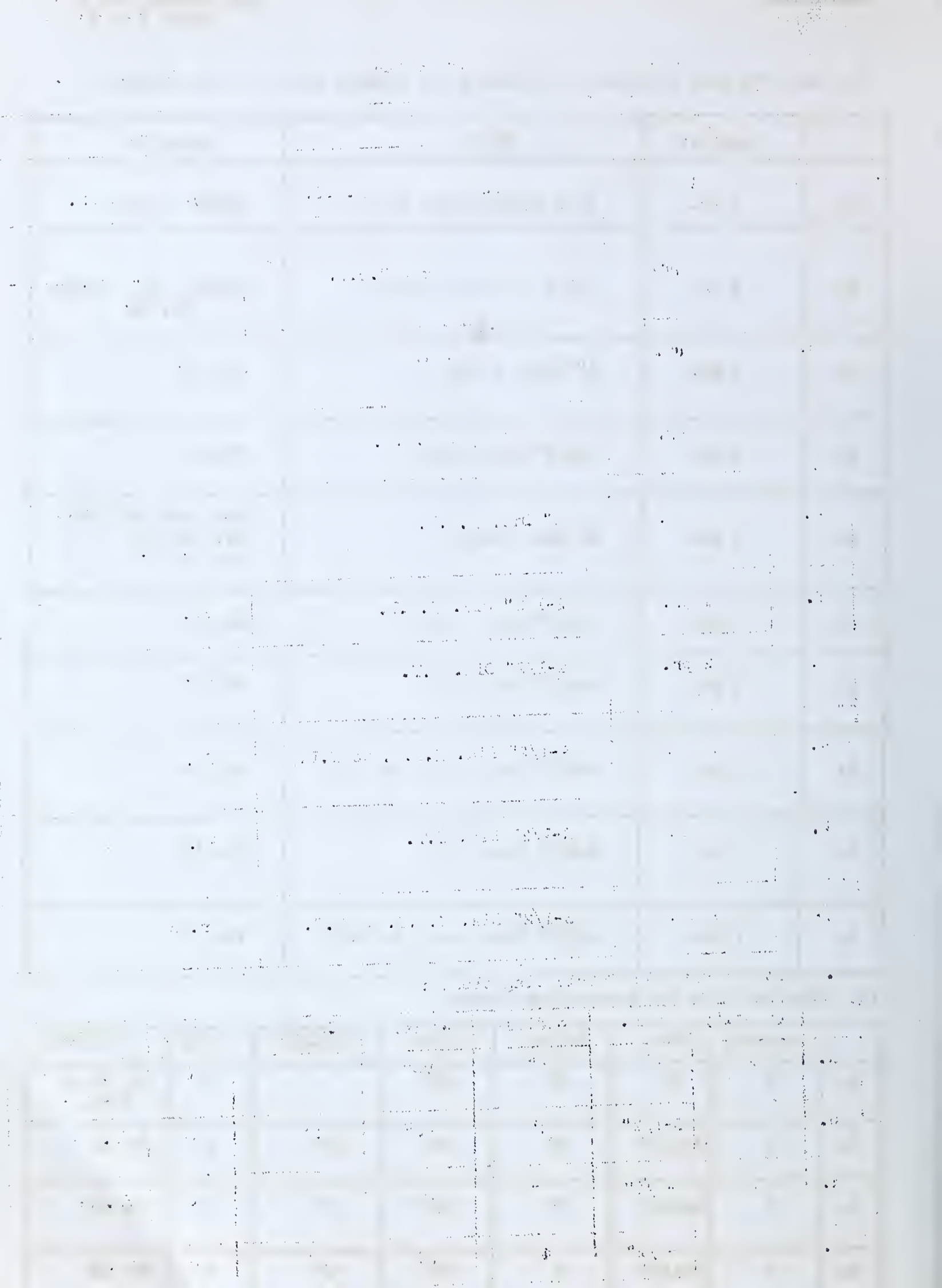
Questions	Answers
1. State the overall length of the long duct.	17' x 10"
2. State the length of rectangular duct under Fr. 33 and 34.	9' x 9"
3. State the length of rectangular duct under Fr. 35 and 36.	8' x 1"
4. State the X dimension of rectangular duct mar. Fr. 32.	x = 7-3/4"
5. State the X dimension of rectangular duct mar. Fr. 33.	x = 12-1/4"
6. State the X dimension of rectangular duct mar. Fr. 34.	x = 12-1/4"
7. State the X dimension of rectangular duct mar. Fr. 35.	x = 12-3/4
8. State the X dimension of rectangular duct mar. Fr. 36.	x = 17-9/16
9. How many collars or "take offs" are on large rect. duct?	4
10. What angles do these collars make to rectangular duct at Fr. 34?	30°
11. State the required number of hangers to support 11 x 12-1/2 duct.	3
12. State the required number of hangers to support 11 x 11 duct.	2
13. State the required number of hangers to support 4-1/2 Terminal line.	1
14. State the required number of hangers to support 6" Terminal line.	2

15. List the data required to fabricate the flanges shown on shop drawing.

	Quantity	Size	Location
a.	1 pr.	11 x 12-1/2 Rect. N.W.T.	#2195 Fr. 32.
b.	2 pr.	11" x 11" Rect. N.W.T.	#2196 - Frs. 34-35-Fr. 36
c.	1 pr.	6" Dia. N.W.T.	Fr. 34
d.	2 pr.	3-1/2" Dia. N.W.T.	Fr. 35
e.	1 pr.	3" Dia. N.W.T.	One each for take off collars Fr. 34.
f.	1 pr.	2-1/2" Dia. N.W.T.	Fr. 36
g.	2 pr.	4-1/2" Dia. W.T.	Fr. 36
h.	2 pr.	4-1/2" Dia. N.W.T. to W.T.	Fr. 36
i.	1 pr.	3-1/2" Dia. W.T.	Fr. 35
j.	1 pr.	3-1/2" Dia. N.W.T. to W.T.	Fr. 35

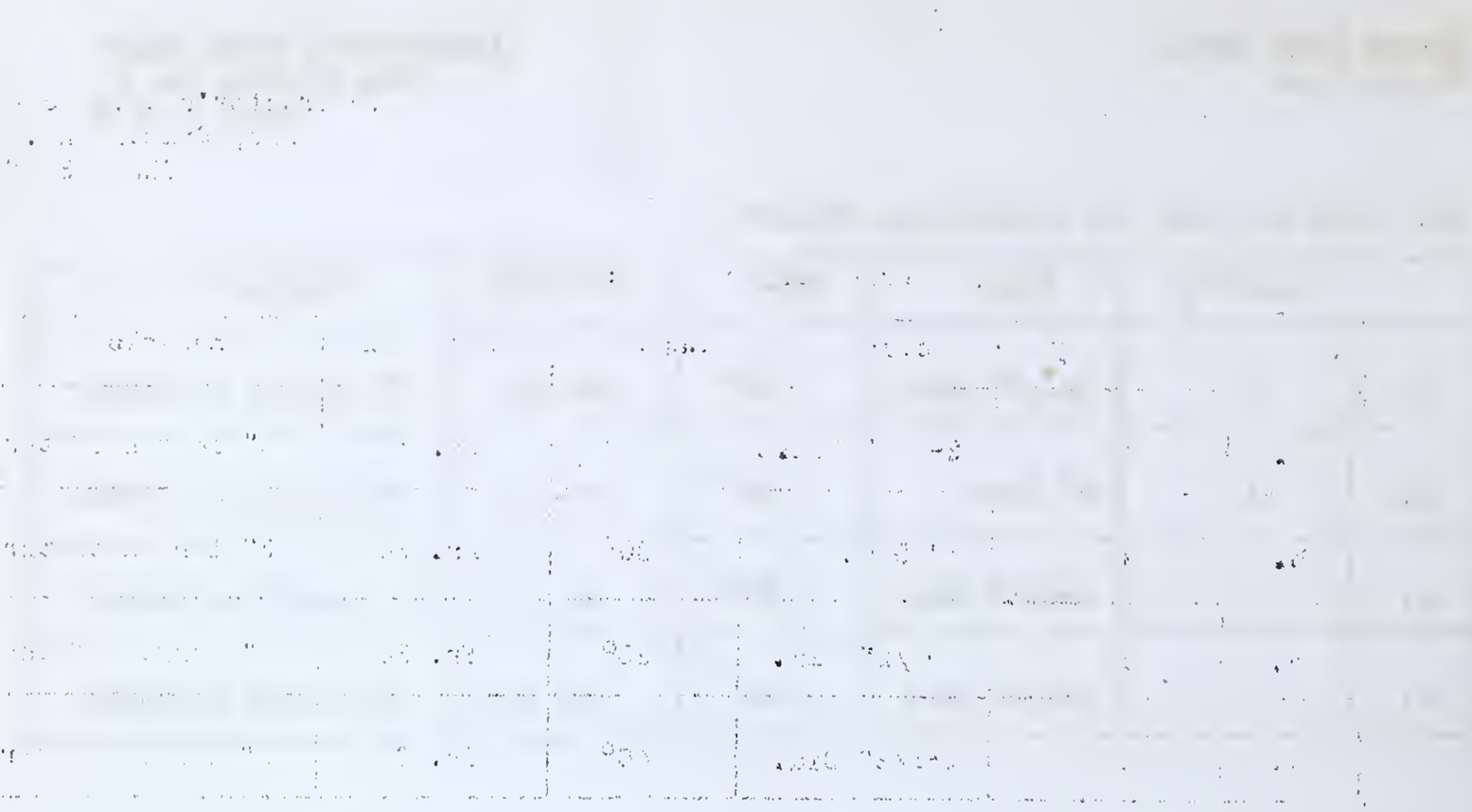
16. List the data for fabricating elbows:

	Quantity	Diam.	Radius	Angles	Straight	Drop	Location
a.	1	6"	6"	90°		0	Fr. 34 at Term.
b.	1	3-1/2"	4"	60°	2"	0	Fr. 34
c.	1	4-1/2"	8"	90°	3"	0	Fr. 36
d.	1	2-1/2"	4	90°	4"	0	Fr. 36



17. List the data for fabricating collars:

	Quantity	Size	Angle	Location	Remarks
a.	1	2-1/2" Dia.	45°	Fr. 32	3" length of throat
b.	1	3" Dia.	30°	Fr. 34	3" length of throat
c.	1	3-1/2" Dia.	30°	Fr. 34	3" length of throat
d.	1	2-1/2" Dia.	40°	Fr. 36	3" length of throat



Instructor's Guide Sheet
Shop Drawing No. 7

SUPERSTRUCTURE DK

STARB'D 48 - BH 50

Questions	Answers
1. What is the distance from a ℄ of the 18" x 13-1/2" galvanized flange to the ℄ of the 13" x 8-1/2" flange?	42-1/4"
2. What is the measurement from DK to DK?	7' 9"
3. What is the "X" measurement of fitting "A"?	X = 7'0"
4. What is the size of the duct that contains the damper 1941?	13" x 8-1/2"
5. What is the elevation of the extra flange?	X = 11-1/2"
6. State the distance from ℄ of extra flange to ℄ of 13" x 8-1/2" fitting.	2' 7"
7. What is the distance from Bh'd 50 to ℄ of fitting "A"?	19-1/4"
8. What is the distance from ℄ of fitting "A" to ℄ of 13" x 8-1/2" N.W.T. duct?	6' 0-1/2"
9. What is the direction of air flow?	Aft
10. What are the end sizes of fitting "A"?	18 x 13-1/2" rect. to 13 x 8-1/2" rect.
11. What are the end sizes of fitting "B"?	13 x 8-1/2" rect. to 13 x 8-1/2" rect.
12. Name fitting "A".	Transforming Elbow
13. Name fitting "B".	90° Drop Elbow
14. State the number of flanges shown on print.	4
15. Give the sizes of all flanges.	3 Fg. 13" x 18-1/2" 1 Fg. 18" x 13-1/2"

(Make an elevation sketch of the layout looking for'd.)

BRIDGE DECK

PORT STARB'D BHD 39-40

PASSAGE

TO BE MADE OF BRASS

Questions	Answers
1. What is the scale of the drawing?	3/4" = 1' 0"
2. What Bhds. are included in this layout?	39 & 40
3. State the distance from Bhd. 39 to 9-1/2" x 4" duct.	28-3/4"
4. State the "X" dimension of 9-1/2" x 4" duct at flange 2143.	X = 7"
5. State the "X" dimension of 9-1/2" x 4" duct at the No. 8 long'l.	X = 15"
6. State the "X" dimension of 9-1/2" x 4" duct at Bhd. 40.	X = 8-1/8"
7. State the "X" dimension of 9-1/2" x 4" duct at long'l 9.	X = 15"
8. State the "X" dimension of flange 2137.	X = 8-1/8"
9. State the length of 9-1/2" x 4" duct from flange 2143 to ℄ of elbow.	14' 10-1/2"
10. What is the distance between bottom of section "A" and top of 9-1/2" x 4" duct?	2"
11. What angle does the collar for section "B" make with 16-1/8" x 8" duct "A"?	45°
12. What is the "X" dimension of 5" diameter spool?	X = 5"
13. State distance from ℄ of 5" diameter spool to Bhd. 39.	30"
14. What are the end dimensions of transition "B"?	5" dia. and 8-3/4" x 7-1/2"
15. Specify the size of 90° elbow on section "B".	8-3/4" x 7-1/2" 6" rad. 90°

(continued)

16. State the heater dimensions at flange 2189. — 4" x 8¾" x 7½"

17. What angle does the collar for section "C" make with "A"? — 30°

18. Specify the size of elbow in section "C". — 60° 4" rad. 4½" dia.

19. Does the duct "C" go under or through Long. 8? — Through; X= 5"

20. State the end dimensions of transition piece in duct"C". — 4½" dia. 8¾" x 7½" rect.

21. What is the "X" dimension of heater at flange 2178? — X= 8

22. What is the "X" dimension of collar on section "D". — X= 7

23. Specify the size of the 60° elbow on section "D". — 60° 5" rad; 4½" dia.

24. Specify the size of the 90° elbow on section "D". — 90° 4½" rad; 4½" dia.

25. State the number of elbows shown on drawing. — 6

26. Make an elevation sketch of this layout.

MAIN DECK

PORT & STARB'D BH 17-19

FAN ROOM

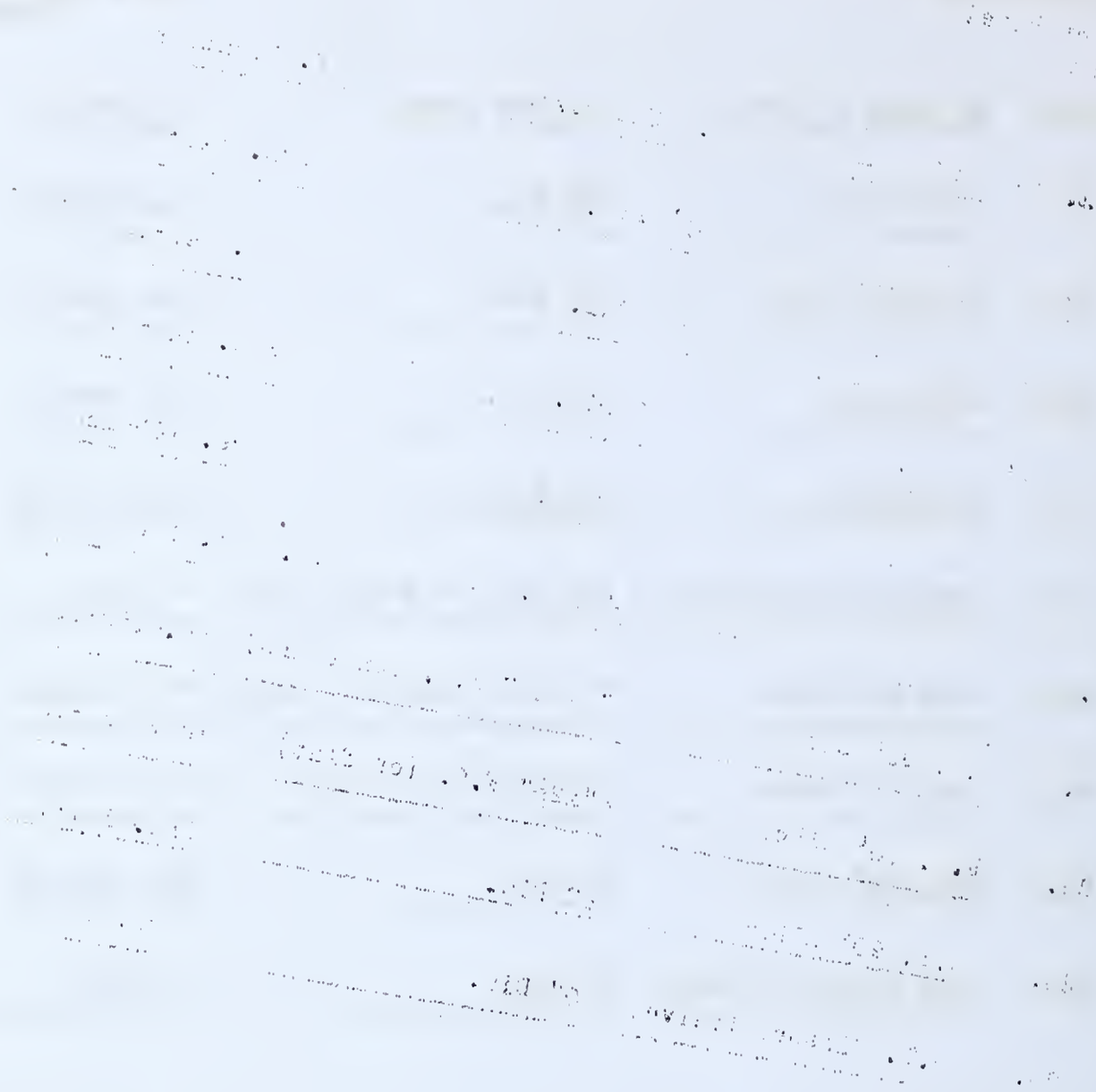
Questions	Answers
1. State the scale of drawing No. 9.	1" = 1'0"
2. State the size of the terminal.	3" dia.
3. What is the item number of the flange near adjustable baffle?	2120
4. State the size of the duct at flange 2120 which contains baffle.	11" x 6½"
5. What is the "X" measurement of the flange 2120?	X = 13"
6. What is the elevation of the duct "B"?	X = 7¼" X = 13"
7. State the distance from ℄ to ℄ between Fr. 18 and 19.	47½"
8. State the direction of air flow.	Starb'd side
9. State the distance from M.J. Bh'd to ℄ of Fr. 18.	29"
10. State the distance M.J. Bh'd to ℄ of 12" x 10" flange	15-5/8"
11. State the offset distance O.G. fitting duct 7½ x 6½.	15"
12. State the ℄ to ℄ distance between 5" diameter duct and Fr.18.	7¼"
13. State the elevation of 5" diameter duct at intake.	X = 19"
14. State the elevation of the 6" diameter duct connecting terminal.	X = 13"
15. What type of ventilation is shown?	N.W.T.
16. Wha t is the rise of O.G. fitting?	5¾"
17. What is the size of Fr. 18?	7" x 7"

SUPPLY SYSTEM IN 5" POWDER MAG. G

Note: Read Drawing No. 10 and list in column A the name of items shown on drawing; Column B the end sizes of each item; Column C the location of each item. See Item No. 1 as an example.

Item	A- Name of Item	B. End sizes	C. Location
1.	Transition	13½ x 6 F.O. to 8" dia.	Frs. 148-149
2.	Reducing offset	13½" x 6" F.O. to 13½" x 4" F.O.	Frs. 149-150
3.	Central Reducer	13½" x 4" F.O. to 11½" x 4" F.O.	Frs. 150-151
4 & 5.	Straight Duct	11½" x 4" F.O.	Frs. 152-154
6.	"Y" Branch	Base = 11½" x 4" F.O. Branches = 6" x 4" F.O.	Frs. 155-156
7.	45° Elbow	6" x 4" F.O.	Frs. 156-157
8.	Central Reducer	6" x 4" F.O. to 8"x2½"F.O.	Frs. 156-157
9.	F.O. 90° Elbow	8" x 2½" F.O. (on flat)	Frs. 156-157
10.	Straight Duct	6" x 4" F.O.	Frs. 156-157
11.	Straight Duct	6" x 4" F.O.	Frs. 156-157
12.	Central Reducer	6" x 4" F.O. to 8"x2½"F.O.	Frs. 156-157
13.	F.O. 90° Elbow	8" x 2½" F.O. (on flat)	Frs. 156-157
14.	F.O. 90° Elbow	8" x 2½" F.O. (on flat)	Frs. 150-151
15.	Central Transformer	8" x 2½" F.O. to 4½" Dia.	Frs. 150-151
16.	90° Elbow	4½" Dia.	Frs. 150-151

Item	A. Name of Item	B. End Sizes	C. Location
17.	90° Elbow	4½" Dia.	Frs. 149-150
18.	Straight Duct	4½" Dia.	Frs. 149-150
19.	45° Collar	4½" Dia.	Frs. 149-150
20.	45° Elbow	4½" Dia.	Frs. 149-150
21.	Central Transformer	4½" Dia. to 8"x2½" F.O.	Fr. 150
22.	F.O. 90° Elbow	8" x 2½" F.O. (on sharp)	Frs. 150-151
23.	F.O. 90° Elbow	8"x2½" F.O. (on flat)	Frs. 150-151
24.	W.T. 90° Elbow	8" Dia.	Frs. 147-148
25.	W.T. Closure (valve)	8" Dia.	Frs. 148



ALTERATION FOR NEW K-DR

2ND DK - PORT & STARB'D SIDE

FRS. 90-94 - SUP.SYS.

Note: Listed below are some of the fittings shown on drawing No. 11, and dimensions required to fabricate each fitting. Read the drawing to obtain the necessary fabrication dimensions and then record findings in the spaces provided on this sheet.

1. Type C Elbow

Size at flange end	20"x12" Rect.	Size at opposite end	20"x12" Rect.
"X" dimension	14-1/4"	"X" dimension	14-1/4"
Length of Straight	21"	Throat radius	20"
Location	Long. 4 & 5	Splitter radius	30"

2. Fitting No. C

Size at elbow end	20"x12" Rect.	Size at opposite end	24"x12" Rect.
"X" dimension	14-1/4"	"X" dimension	14-1/4"
Length	18"	Straight on	Aft side
Location	Long. #3		

3. Transformer No. D

Size at flange end	27-1/2" x 12" F.O.	Size at opposite end	24"x12" Rect.
"X" dimension	12"	"X" dimension	14-1/4"
Length of transformer	28"	Length of straight	24"
Offset	2¼"	Location	Long. 2 & 3

4. Spool

Size of spool	27-1/2"x12" F.O.	Length	9"
"X" dimension	12"	Location	Long. 1&2

5. Straight F.O. Duct

Size of spool end	27-1/2"x12" F.O.	Size at opposite end	27-1/2"x12" F.O.
Length	6' 0"	Location	Long. #1

6. Branch "A" Collar #1

Size	7-1/2" dia.	Length of throat	3"
Angle	30°	Location	Long. #3

7. Branch "A" Elbow #2

Size	7-1/2" dia.	Length of Straight	14"
Angle	60°	Location	Long. 3&4
Radius	5-1/2"		

8. Branch "A" Reducer #3

Size at elbow end	7-1/2" dia.	Size at terminal	11" dia.
"X" dimension	22"	"X" dimension	22"
Size at Fr. 93	9"x18" web	Location	Fr. 93 Between Long. 3&4

9. Branch A - Terminal

Size of terminal	11" dia.	Location	Fr. 93 Between Long. 3&4
"X" dimension	22"	Type of terminal	E

10. Branch B - Collar

Size of collar	8" dia.	Length of throat	3"
"X" dimension	14-1/4"	Angle	30°

11. Branch B - Elbow at Collar

Size	8" dia.	Length of straight	8"
Angle	60°	Location	Long. #5
Radius	8"		

12. Branch B - Duct

Size	8" dia.	Location	Long. #6
"X" dimension	14-1/4"	Length	5' 0"

13. Branch B - Elbow (at Terminal End)

Size	8" dia.	Length of straight	1" lap
Angle	45°	Location	Long. #7
Radius	8"		

14. Branch B - Reducer

Size at elbow end	8" dia.	Size at terminal end	11" dia.
"X" dimension	16"	"X" dimension	16"
Length	24"	Location	Long. #8

UPPER DECK

STARB'D SIDE PASSAGE

1. What are the dimensions of the heater?

   a. Size (Flg. 2242) 23-3/4" x 10" dimension 11-1/2"

   b. Length of heater 5" Location BH'D 44

2. What are the dimensions of Transition fitting from heater to item "A"?

   a. Size at flange end 23-3/4" x 10" Rect. X dimension 11-1/2"

   b. Size at elbow end 12" x 5" Rect X dimension 10-1/2"

   c. Size of access hole 6" x 8" Location In fitting between heater and elbow "A"

3. What are the dimensions of elbow "A"?

   a. Size at Flg. end 12" dia. X dimension X= 9-1/2"

   b. Size at Fr. 45 12" x 5" X dimension X= 10-1/2"

   c. Throat radius 10" Angle 90°

   d. Location Fr. 45

4. What are the dimensions of Fitting "B"?

a.	Size at spool end	12" dia.	X dimension	X= 9-1/2"
b.	Size at Flg. end 3037	11" x 10"	X dimension	X= 16"
c.	Length of straight (spool end)	18"		
d.	Length of straight (flange end)	12"		
e.	Radius of throat	5" rad.	Angle	90°
f.	Size of Splitter	5-3/4" x 10"	Location	Between Fr. 45 - 46
g.	Size at flg. 2222 end	11" x 6" Rect.	X dimension	X= 6"
h.	Length of straight near Fr. 44	24"		
i.	Diameter of collar	3" dia.	Location	Between Fr. 44-45

5. What are the dimension for straight duct?

a.	Size of duct	11" x 10" Rect.	X dimension	X= 16"
b.	Length of duct	7' 6"	Drop	None
c.	Location	Between Fr. 45-48		

SUPERSTRUCTURE DK.

STARB'D FR 40-44

	Questions	Answers
1.	What is the location of this job?	Superstruct Dk. Star'bd. Fr. 40-44
2.	State the dimensions of flange 2665.	10" x 4" F.O.
3.	What is the distance from ℄ to ℄ between flange 2265 and Fr. 41?	10¼"
4.	State the length from flange to flange of the 9 x 4 duct.	54-5/8"
5.	State the distance from ℄ to ℄ flange 2678 and frame 41.	11-1/8"
6.	What is the throat radius of type "C" elbow?	10"
7.	State the elevation of flange 2679.	x = 10"
8.	State the length of the 11x 8 N.W.T. duct.	9' 10-3/8"
9.	State the **drop** of the 11 x 8 N.W.T. duct.	1-1/4"
10.	How many flanges are shown in this detail?	11
11.	What type baffle is installed at the branch?	Adjustable
12.	What size split is specified in type "C" elbow?	8"
13.	What is the drop in the type "C" elbow?	6"
14.	What is the rise in the "A" fitting?	1"
15.	How many spools are shown?	1
16.	What is the dimension of the fitting that connects the duct to flange 2665?	9" x 4" Rect. to 10" x 4" F.O.
17.	State distance from ℄ of ship to ℄ of spool.	59-1/8"